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CHRONIC COUGH IN CHILDREN

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ABSTRACT

Chronic cough is defined as a persistent and unremitting cough lasting more than four weeks. Due to the immature immunological response, infection is the main cause for cough in infancy. In general, children are more vulnerable to environmental factors. Cough may be the first symptom of many diseases or conditions affecting the respiratory tract, a cough can represent more than a defense mechanism. Through its persistence, it becomes a helpful indicator of potential disease conditions. Almost all diseases of the respiratory tract, and some cases of the extra-respiratory tract, can cause chronic cough. Cough reflex is a complex and precisely timed neuromuscular phenomenon that involves the diaphragm chest wall muscles, cervical muscles, abdominal muscles, laryngeal abductor and adductor muscles, and both medullary and cortical brain regions. Ayurveda explains the stage of *Balyawastha* or the childhood as stage of immaturity in structural, functional, emotional, and linguistic and behaviour and sexual facets with predominance of the *Kapha Dosha*.

KEYWORDS: Chronic Cough, Children, *Kasa*, *Vatanulomana.*

INTRODUCTION

Cough is a common symptom presented in any clinical setting. This can be a normal physiological phenomenon for protecting the airways from pollutants, foreign material or infections or to clear the secretions. In most cases, the cough is a self-limiting feature although it can persist if associated with some pathology.

Cough reflex is a complex and precisely timed neuromuscular phenomenon that involves the diaphragm chest wall muscles, cervical muscles, abdominal muscles, laryngeal abductor and adductor muscles, and both medullary and cortical brain regions.[1] Chronic cough in children is a common reason for healthcare visits and affects between 5% and 10% of children in the general population. Throughout childhood, various developmental phenomena influence the cough reflex. In children, chronic cough should be treated on the basis of etiology.

Chronic cough is defined as a persistent and unremitting cough lasting more than four weeks.[2] Due to the immature immunological response, infection is the main cause for cough in infancy. In general, children are more vulnerable to environmental factors. Cough may be the first symptom of many diseases or conditions affecting the respiratory tract, a cough can represent more than a defence mechanism. Through its persistence, it becomes a helpful indicator of potential disease conditions. Almost all diseases of the respiratory tract, and some cases of the extra-respiratory tract, can cause chronic cough. Excess intake of sweetish substances, growth potential and school environment also contribute for the same.

Depending upon the duration of the symptoms the cough can be classified as acute, subacute or chronic if it persists for less than 3 weeks, 3 to 8 weeks or more than 8 weeks respectively. In most of the cases chronic cough is found to be dry or minimally productive in nature (O'Connell, 1998). Cough can be associated with a number of respiratory or non-respiratory causes. Post nasal drip syndrome, post infectious cough and asthma are important respiratory causes of chronic cough.

A persistent and excessive cough may result in many complications affecting various systems. Post infectious cough is suspected when a normal chest radiograph arrives in a patient having a cough for more than 3 weeks with a history of upper respiratory tract infection. About 25% patients of persistent cough may have a post infectious cause. Although the exact pathophysiology of post infectious cough is not known, it is believed to be caused by air way inflammation with or without hyper responsiveness of mucosa (Irwin et al., 2011).

Ayurveda explains the stage of *Balyawastha* or the childhood as stage of immaturity in structural, functional, emotional, and linguistic and behaviour and sexual facets with predominance of the *Kapha Dosha*. Certain of the Respiratory problems in children are also aggravated by the habit of withholding the natural urges or *Vatanulomana* as maximum protective reflexes in the upper part of the body pertaining to respiratory system and helps to

prevent the portal of entry for maximum infections. Protective reflexes like sneezing, coughing, hiccough, *shrama shwasa*, yawning, Lacrimation etc. in true sense keeps away the respiratory tract infections.

ETIOLOGY

The etiologic distribution of chronic cough in children is not identical to that in adults and varies with age. For newborns and infants, congenital diseases, including tracheomalacia, supraglottic or glottic abnormalities, vascular malformations, primary ciliary dyskinesia and bronchiectasis should be considered. For children younger than 3 years of age, airway infection should be initially considered. The incidence of protracted bacterial bronchitis (PBB) is high in this age group and half of the patients with PBB have tracheomalacia. Airway foreign body aspiration is another important cause of chronic cough in children younger than 3 years of age. In children with a long history of cough but lack of response to routine treatment, the foreign body aspiration should be considered, and chest radiographs or bronchoscopy are required.[4-12]

PATHOGENESIS OF COUGH

Cough is a defensive reflex for clearance of excessive secretions and foreign bodies from airways. The involuntary cough reflex is involved in five sections: the peripheral receptors, vagal afferent nerves, central cough neurons, efferent nerves, and effectors (diaphragm, throat, chest, and abdominal muscles). An effective cough can be induced by stimulation of the irritant receptors of the trachea, bronchopulmonary C fibers, or the mechanically sensitive, acid-sensitive myelinated sensory nerves (Aδfibers). When vagal nerve branches distributed in the upper airway, throat, and esophagus are stimulated, cough can be induced.[3] Cough nerve centre is located in the medulla, which is regulated by the cerebral cortex. Cough hypersensitivity is an important pathophysiological mechanism of chronic cough[13-15] related to the activation of transient receptor potentials (TRP), including TRPV1 and TRPA1, and airway inflammation, neural pathways, and nerve center. Chronic cough can results in a lot of concomitant disorders, such as incontinence, syncope, insomnia, and anxiety, which involve the cardiovascular, digestive, nervous, urinary, and musculoskeletal systems.[15-20]

CLASSIFICATION OF COUGH

Cough is classified into three types based on the duration.

1. Acute
2. Subacute and

3. Chronic cough.

Acute cough is defined as cough lasting for <3 weeks, subacute cough lasts 3–8 weeks and chronic cough persists for >8 weeks.

Cough can also be categorized as dry and wet cough. A wet cough is defined as sputum volume >10 mL per day. Different types of cough have a spectrum of different underlying causes. Based on chest radiography, chronic cough can be further classified into two subtypes.

1. Presence of pulmonary lesions on radiography (eg. pneumonia, tuberculosis and broncho-pulmonary carcinoma) and
2. Lack of overt identifiable abnormalities on radiography.

AYURVEDA PERSPECTIVE

Ayurveda clearly explains the movement of *Apana Vata* and it direction gets reversed in to *Udana Vata* in *samprathi* of *Kasa* which is the root of pathology. Vitiated *Apana Vata* has to brought back to normalcy to overcome the *Kasa Vega*.

Vataja Kasa is condition where in there will be irritation of the respiratory mucosa by different causes. These causes leads to break in the epithelial lining and mucus glands with drying effects on mucosa. Due to irritation of cough centre hacking cough is observed. Hence there will be Irritating cough with less sputum with vigorous coughing bouts leading to *hritkanta parshwa ruja*.[21]

Pittaj Kasa presents with mild feverish and burning sensation in chest. Damage to Mucosa lining leads to permeability changes of the cell and infective process. This can be seen clinically by a cough persisting for 3- 4 days along with gradual development of fever or feverish feeling, burning sensation of respiratory tract, experiencing bitter taste in the mouth (*Tikthasyatha*) with formation of thick and foul smelling sputum.

Kaphaja Kasa presents with symptoms somewhat similar to bronchitis. Child with loss of appetite, heaviness of head and body, feeling of typical sweetish taste in the mouth (*Madura* taste), copious, thick sweetish sputum which is devoid of foul smelling, *anga mardha*, less discomfort, feeling dull (*Kaphapoorna deha*) should be suspected for *Kaphaja Kasa*.

MANAGEMENT

Treatment principles for chronic cough in pediatric patients are to confirm the etiologic diagnosis and provide targeted treatment. If the cause is unclear or relevant testing is not feasible because of age, empirical or symptomatic treatment can be implemented. If cough is not relieved after treatment, re-assessment should be performed. Antitussive agents should not be used for infants.

According to *Ayurveda* following management depending on type of *kasa* (cough) can be initiated.

Vataja Kasa *– Haritaki, Shunti, Marich, Yashtimadhu,Ushna Ambu prayog* etc.

Pittaj Kasa*- Tulasi, Ela, Vacha, Shati, Chitkrakadi leha, Agasthya Haritaki leha, Kantakari Avaleha* etc.

Kaphaj Kasa *- Vasa, Bhrihati, Kantakari* etc.

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